



USAID
FROM THE AMERICAN PEOPLE

TB CARE I



TB CARE I and Three I's – Zambia Final Report

October 1, 2010 – July 31, 2015

Submitted: July 31, 2015

Cover photo: Community TB Treatment Supporter Phales Mulinda taking sputum samples from the Mwachisompola Health Education Zone facility to the Liteta Hospital in Central province, for testing with Xpert MTB/RIF assay. (Mary Chizyuka).

This report was made possible through the support for TB CARE I provided by the United States Agency for International Development (USAID), under the terms of cooperative agreement number AID-OAA-A-10-00020.

Disclaimer

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Table of Contents

EXECUTIVE SUMMARY	6
INTRODUCTION	8
UNIVERSAL ACCESS	9
LABORATORIES	13
INFECTION CONTROL	16
TB/HIV	19
HEALTH SYSTEM STRENGTHENING (HSS)	20
MONITORING & EVALUATION, SURVEILLANCE AND OR	21
TB CARE I'S SUPPORT TO GLOBAL FUND IMPLEMENTATION	23
THE WAY FORWARD	24
ANNEX II: FINANCIAL OVERVIEW	ERROR! BOOKMARK NOT DEFINED.

List of Abbreviations

ACSM	Advocacy Communication and Social Mobilization
ART	Anti-retroviral therapy
CB-DOTS	Community Based Directly Observed Therapy Short course
CDC	Centers for Disease Control and Prevention
CIDRZ	Centre for Infectious Disease Research
CNR	Case Notification Rate
CPT	Cotrimoxazole Preventive Therapy
DCMO	District Community Medical Officer
DOTS	Directly Observed Therapy Short course
EQA	External Quality Assessment
HCW	Health Care Worker
IC	Infection Control
ICF	Intensified Case Finding
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
KNCV	KNCV Tuberculosis Foundation
LED	Light Emitting Diode
LQMS	Laboratory quality management system
MCDMCH	Ministry of Community Development Mother and Child Health
MCH	Maternal and Child Health
MDR-TB	Multi-drug-resistant tuberculosis
MGIT	Mycobacterial Growth Incubator Tube
MoH	Ministry of Health
MSH	Management Sciences for Health
NSP	National TB Strategic Plan
NTRL	National TB Reference Laboratory
PCA	Patient Centered Approach

PMDT	Programmatic Management of Drug Resistant Tuberculosis
PMO	Provincial Medical Officer
PMU	Project Management Unit
SoW	Scope of Work
SRL	Supranational Reference Laboratory
TB	Tuberculosis
TB CTA	Tuberculosis Coalition for Technical Assistance
TB IC	Tuberculosis Infection Control
USAID	United States Agency for International Development
WHO	World Health Organization
Zampost	Zambia Postal Services
ZPCT II B	Zambia Prevention Care and Treatment partnership II Bridge

Executive Summary

The United States Agency for International Development (USAID) provided investment of \$17,624,000 in Zambia through a cooperative agreement with the lead organization KNCV Tuberculosis Foundation (KNCV) under the TB CARE I project, in support of the Ministry of Health (MoH) and the Ministry of Community Development Mother and Child Health (MCDMCH) towards TB control. KNCV is the lead partner among a team of global partners called the Tuberculosis Coalition for Technical Assistance (TBCTA). TB CARE I in Zambia was led by FHI 360, with KNCV, Management Sciences for Health (MSH) and the World Health Organization (WHO) as collaborating partners. The project was guided by a Scope of Work developed with the USAID mission, a memorandum of understanding with the Zambia Government and a National TB Strategic Plan (2011-2015). The project also participated in the development of the revised National TB Strategic Plan (2014-2016) and the Global Fund combined TB/HIV concept note that was successfully granted in January 2015.

Key achievements were made in the support provided to the Zambian government are outlined below:

National Prevalence survey

TB CARE I successfully partnered with the National TB Control Program under the MCDMCH and the MoH to conduct the first national TB prevalence survey, providing technical assistance in the development of the protocol and standard operating procedures, provision of quality assured field implementation, data collection, data management and report writing. A total of 46,099 people participated in the survey out of a target of 54,400, with a participation rate of 84%. During the dissemination meeting, it was reported that the prevalence of bacteriologically confirmed TB was 638 per 100,000 population (CI: 502 -774), higher than the WHO estimated prevalence of 338 per 100,000 (CI: 193-524). Key equipment were procured for the survey that included three liquid culture Mycobacterial Growth Incubator Tube (MGIT) machines placed at three reference laboratories. The project also supported the digitalization of three analogue X-rays used on all survey participants and procured all commodities for the field survey activities.

Development of the Global Fund Concept note and National Health Strategic Plan

The TB CARE I partnership provided leadership in the development of the national TB strategic plan (NSP) for 2014 to 2016 that provided a platform for the development of the combined TB/HIV concept note for the Global Fund. Technical support was provided by local and international TB CARE I partners during the grant writing process. The country was successful with the application and received total funding for TB/HIV of \$152,453,652. The total cost of the TB activities in the national strategic plan was \$67,438,311. The Zambian government committed \$18 million dollars (31%) while \$38 million (56%) was provided by partners and the current global fund allocation under the Transitional Funding Model (TFM). The New Funding Model allocation of \$11 million covers the remaining gap (16.5%)

Increased quality of TB services through active engaging of community based TB DOTS

The National TB Control Program (NTP) has over the years of program implementation engaged communities in their respective districts to participate in the provision of health services at facility and community level. Through TB CARE I, over 400 community volunteers were trained in DOTS from year one to year five of project implementation in all six target provinces. Under the Three I's initiative, 125 community TB treatment supporters were actively engaged and retained for one year to support health facility and community level active case finding. The TB treatment supporters were provided with training in DOTS, enablers that included a bicycle, aprons and footwear, and they received monetary support. The supporters traced 3,987 individuals who had contact with an individual diagnosed with TB in their households and 109 (2.7%) of these contacts were diagnosed with TB.

Enhanced capacity, availability and quality of laboratory testing with provision of laboratory equipment

The TB CARE I project procured key laboratory equipment for enhanced diagnosis of TB, provision of liquid culture and confirmation of drug resistant samples through drug susceptibility testing. Thirteen Xpert MTB/RIF machines, three MGIT machines, one MTBDR genotype were procured. The equipment enhanced diagnosis of TB from the national TB reference level to the regional and facility level laboratories. The project also provided training support in the use and maintenance of the Xpert MTB/RIF machine to the NTRL and diagnostic facilities in the Central and Copperbelt provinces. Renovation support was also provided at the NTRL and the Tropical Diseases Research Centre (TDRC) before placement of the MTBDR genotype equipment. With the Xpert MTB/RIF technology, 18,209 tests were performed from September 2013 to May 2015. Active TB disease was diagnosed in 2,449 patients (13.4%) and Rifampicin resistance was detected in 121 of the diagnosed cases (5%). 1,311 (7%) of the 18,209 GeneXpert tests performed were from five prison facilities, of which 67 (5%) were positive for MTB. Seventeen health care providers were hired by the TB CARE I project to support these activities.

Introduction

The USAID-funded TB CARE I project was implemented in Zambia by a project team of thirty nine staff members that provided technical, financial, administrative and programmatic support to the national level NTP as well as to NTP in the six target provinces of the Central, Copperbelt, Luapula, Muchinga, Northern and North Western provinces. The country project was part of a cooperative agreement between USAID and KNCV, with a life period of September 29, 2010 to September 28, 2015. The project was guided by national and international strategies in TB control that included the global Stop TB Strategy, the National TB Control Strategy (2011-2015, and 2014-2016), and the USAID Scope of Work (SoW). FHI360 was the coordinating partner, collaborating with MSH, WHO and KNCV.

The vision of the country as reflected in the NSP is to create a Tuberculosis free Zambia and the goal is to reduce the prevalence of TB by 50% relative to the estimated 1990 levels by 2016 and sustain the reduction in mortality. TB CARE I provided key leadership in the provision of TB control activities towards this vision and goal through the focus areas of project support. The project was a key partner in the measuring the TB prevalence in Zambia through the first national prevalence survey conducted from August 2013 to October 2014. TB CARE I also enhanced TB/HIV and TB-IC activities that are key for infection prevention and patient follow-up care, resulting in a reduction in TB mortality. The project also supported effective implementation of quality DOTS expansion and enhancement. The project objectives as outlined in the USAID SoW are listed below:

- Support the MOH to achieve optimal community participation in TB control;
- Assist the MOH to address TB/HIV, MDR-TB, and other challenges;
- Support the MOH to engage all public and private TB care providers;
- Provide support for Public Health Evaluations (PHEs); and,
- Collaboration and coordination with other partners and activities.

TB CARE I staff members provided central level and facility level technical support. The project partners participated in weekly NTP meetings and national technical committees that were established for TB/HIV, multi-drug resistant TB (MDR-TB), Xpert MTB/RIF implementation, and Advocacy Communication and Social Mobilization (ACSM). Seventeen staff members were placed in government health facilities to provide daily technical support and partner with the health care providers. The project partners also provided local and international technical support to the NTP in key focus areas of program implementation including ACSM, laboratory strengthening, Infection Control, PMDT, TB/HIV, Monitoring and Evaluation, Surveillance and Operational Research.

TB CARE I partnered with other PEPFAR funded organizations that included the Centers for Disease Control and Prevention (CDC) through the Centre for Infectious Diseases Research in Zambia (CIDRZ) and the Zambia Prevention Care and Treatment Partnership (ZPCT II Bridge) in supporting NTP efforts. CIDRZ provided support for the Three I's activities in the Lusaka and Southern provinces while ZPCT II Bridge provided renovation support and staff training in HIV care and treatment.

The project applied the overarching elements of TB CARE I. There was active collaboration with local partners, the NTP, provincial and district medical offices in the implementation of all activities; TB CARE I provided leadership in the coordination of all field activities, including required travel by local and international consultants; ensured access to TB services for all people through Intensified Case Finding efforts, Infection Control and DOTS strengthening activities at facility and community level; and was highly responsible and responsive through the leadership by FHI360 and the contribution of project partners in providing timely reports and required documentation to the USAID mission, the NTP, the Provincial Medical Offices (PMOs), the District Community Medical Offices (DCMOs) and the project management unit (PMU). The project provided successful results on annual key targets that reflected the priority areas of the NTP. The project plans to share an evaluation report following ethics approval, titled: The effectiveness of the TB CARE I project interventions on TB case notification, TB treatment outcomes, and TB – related mortality in Central and Copperbelt provinces of Zambia.

Universal Access

TB CARE I provided support in the development of key strategic guidelines in the provision of universal access to care. The project provided technical support in the revision the national TB strategic plan (2014-2016) and the development of the Advocacy Communication and Social Mobilization (ACSM) strategy. The TB CARE I project implemented key DOTS strengthening activities in the six provinces under the guidance of the PMOs and DCMOs. The project also participated in the intensified case finding (ICF) of 2,449 TB cases in two provinces that covered four prisons, 15 health facilities and surrounding communities, in partnership with CIDRZ which supported two other provinces. The monitoring of ICF activities was done by both partners through quality assessment visits every quarter from 2013 to 2015 in the target provinces.

Technical Outcomes

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y5	Y5
1.1.1	Number of facilities where quality of services is measured	This is a measure of the quality of TB services in an ART setting, using a TB quality assessment tool (TB-qual) developed for the 3 I's initiative	15/18 under 3 Is (2013)	18	18
1.2.4	Children younger than 5 (contacts of ss+ adults) that were put on IPT	The number of children under five years of age who are contacts of SS+ adults and were put on Isoniazid Preventive Therapy (IPT)	N/a	100	N/a The TB CARE I project was not able to successfully track the provision of IPT in children because the NTP did not have INH and a reporting format available at primary health care level for IPT. Following introduction of IPT guidelines in 2015, The TB CARE I staff were able to track IPT provision to 390 PLHIV in nine facilities from January to March 2015

1.2.7	Prisons with DOTS	The coverage of prisons providing DOTS services. Prisons should regularly diagnose and refer suspects and should put patients on treatment in order to be qualified.	4 (Year 3)	4	5 DOTS was provided to Kamfinsa, Kansenji, Kaloko, Mukobeko Medium and Mukobeko maximum prisons
1.2.8	CB-DOTS program is implemented	This indicator measures the level of implementation of Community-based (CB) DOTS from introduction to piloting and scaling up. Score based on below: 0 = There is not a CB-DOTS program in the country and there are no plans prepared for this purpose. 1 = There is not a CB-DOTS program in the country but plans are ready for piloting. 2 = NTP has piloted CB-DOTS in selected geographic areas. An implementation plan including a timeline and budget with activities should be in the plan. 3 = NTP has scaled-up the implementation of CB-DOTS to additional geographic areas and data are available at the national level on CB-DOTS referrals and patients on treatment in CB-DOTS areas.	3 (Year 3)	3	3 One hundred and twenty four community volunteers were engaged in two provinces. They provided facility and community DOTS, including tracing of 3,987 contacts of TB patents, of which 109 (2.7%) were diagnosed with TB.
1.2.9	Population covered with CB-DOTS	This indicator measures CB-DOTS coverage by looking at the population the CB-DOTS is servicing	100%	100% (of TB CARE I geographic areas)	CB-DOTS was provided in the six districts that TB CARE I was working in. The Community Volunteers were highly motivated with the trainings,

					enablers and transport re-imbursement that was provided to them.
1.2.10	Health facilities offering CB-DOTS services	This indicator measures CB-DOTS coverage by looking at the percentage of health facilities providing CB-DOTS services	100%	100%	Selected facilities in the six districts received support for CB-DOTS with TB CARE I input. However, the NTP has provided CB-DOTS in all facilities providing TB treatment support.

Key Results

DOTS enhancement with expansion to prison facilities

TB CARE I expanded DOTS activities through staff capacity building and engagement of community volunteers and prison service providers. The health care providers enhanced early case finding at both facility and community level, provided patient care and household follow-up support for tracing of contacts. A total of 4,162 people were trained to provide this DOTS support during the life of the project and they included health care providers, prisoners and community volunteers. 76 of the 4,162 people trained were prison inmates. The project support increased the number of TB cases detected from the target facilities and surrounding catchment communities and provision of early TB treatment and active follow up care to these patients.

Intensified TB case finding was extended to four prison facilities, under the Ministry of Home Affairs, Zambia Prisons Service. 59 prison service providers (26M, 33F) and 76 prison inmates (57M, 19F) were trained in TB DOTS. A total of 1,311 prison inmates were screened for TB and 67 prisoners were diagnosed with Tuberculosis, using Xpert MTB/RIF as the diagnostic tool.

Active engagement of community volunteers

124 community volunteers were actively engaged in ICF in the two provinces that implemented the Three I's initiative. The volunteers worked with health care providers in 15 health facilities and their surrounding communities. They provided patient support, enhanced community sensitization in the public settings including local churches, market places, and influenced traditional healer practices. They were key partners in the tracing of TB contacts at household level. 3,987 community contacts were traced and screened, out of which 109 (2.7%) were diagnosed with TB.

The volunteers received training in DOTS to conduct the community activities. They also received monetary support and enablers that included bicycles, sputum cooler boxes, shoes, bags and stationary. This approach provided for a motivated group of volunteers and should be considered by the NTP for engagement with community volunteers.

Advocacy Communication and Social Mobilization (ACSM)

A national ACSM strategy was developed by a national ACSM subcommittee with support from the TB CARE I partners during year two and year three of project implementation. The ACSM strategy was developed to provide an intersection for the delivery of effective TB health care services between health service providers, communities and civil society. Key focus outcomes would include a patient centered approach to care, engaging communities to find solutions to challenges in TB control including stigma, delayed case finding and treatment adherence, and provision of effective communication strategies for individual and community social change towards health provision.

Patient Centered Approach

A patient centered approach (PCA) package was piloted in three districts in the North Western province during the third year of project implementation. The three PCA tools including the Patients Charter that focused on the needs and rights of patients and expectation from health care providers; the TB Literacy Toolkit that enabled health care providers and community volunteers increase their awareness of TB and HIV with regards to counselling and testing services, and patient adherence to treatment; and the Quote TB Light tool that was a management tool to measure the quality of TB care from a patients perspective using nine quality dimensions to assess this quality of care.

The PCA data was collected both at baseline and after intervention (end line). Both quantitative and qualitative data were collected from structured interviews, focus group discussions and an interviewer administered semi structured questionnaire. The PCA interventions highlighted many issues including a limited knowledge of patients on TB and HIV during baseline assessment and that most of the knowledge was acquired from health facilities. There was no significant difference in the information that clients had on TB between baseline and endline assessments and participants made suggestions to have more information provided on TB through more clinics, encouraging community awareness and sensitization through schools and media. At baseline, fifty two percent (52%) of the respondents reported knowing how TB was spread. At endline, at least 63.6% of the participants in the intervention and control group correctly indicated that TB was caused by bacteria, and 81.1% agreed that anyone could get infected with TB. Health seeking behaviour of patients and the inhibiting factors were also documented and it was observed that 59% of stigma was perpetrated by family members. The results also showed that individuals disclosed their health condition to family members and reasons for disclosure included emotional support and encouragement, preventing infection to other family members and avoiding misconception on TB disease. There was no difference among the participants on education, sex and socioeconomic factors at baseline and endline.

Challenges:

The project had challenges to provide IPT to children less than five years of age and to PLHIV because the health care facilities were not provided with reporting and recording tools, and isoniazid to provide IPT, until 2015. TB CARE I was supposed to provide technical support to the NTP for IPT implementation but was not able to do so without the availability of the national guidelines, or approved reporting and recording tools. In the future, the NTP will need to enhance staff capacity in the provision, reporting and recording of IPT, especially in children exposed to TB patients.

The project did fully engage the private sector over the years of implementation because of limited NTP staff to support active private sector involvement in a harmonized way with NTP requirements.

Laboratories

The TB CARE I project enhanced laboratory systems and services during the five years of project implementation that included the scaling up of quality assurance through external quality assessment (EQA) in 144 TB diagnostic facilities in six of the ten provinces in the country, introduction of a presumptive MDR-TB sputum specimen referral to facility providing culture/DST services, building of laboratory staff capacity in biosafety, quantification and forecasting of commodities, use of LED microscopy and Xpert MTB/RIF technology. TB CARE I also participated in the introduction of new technologies that included thirteen Xpert MTB/RIF machines, one GenoType MTBDRplus (Hain technology) and three MGIT machines.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y5	Y5
2.3.2	Rapid tests conducted	Number of rapid tests conducted using GeneXpert MTB/RIF	387 (year 3)	15,000	18,209

Key Results

Technical Assistance for the National Reference Laboratory team:

The National TB Reference Laboratory (NTRL) received technical support from the local and international laboratory consultants under MSH and KNCV, including consultants from the Supranational Reference Laboratory (SRL) in Uganda. The support focused on strengthening the reference laboratory in the quantification and forecasting of laboratory commodities, the use and maintenance of the Xpert MTB/RIF technology, the verification of the Line Probe Assay and MGIT equipment, the second line drug susceptibility testing (DST), the laboratory quality management system (LQMS), and the development of guidelines for AFB smear microscopy and EQA. The NTRL staff members are now providing supervisory support to other laboratories in these key laboratory services.



Two rooms renovated for placement of the GenoType MTBDR-plus (Hain Science) Line Probe Assay machine at the Tropical Diseases Research Centre (photo taken by Chitambeya Mukwangole –TB CARE I staff member)

Implementation of the Xpert MTB/RIF technology

TB CARE I procured and placed 13 Xpert MTB/RIF assays in public health facilities to support ICF. 18,209 samples were successfully tested with this technology and 2,449 (13.4%) individuals were diagnosed with TB. 121(5%) of the 2449 were found to be rifampicin resistant and 12 out of 121 were confirmed MDR-TB. The project exceeded the target number of tests because of the expansion of the implementation of ICF activities to four prison facilities. 1,311 (7%) out of the total number of individuals tested (18,209) were from the prison facilities.

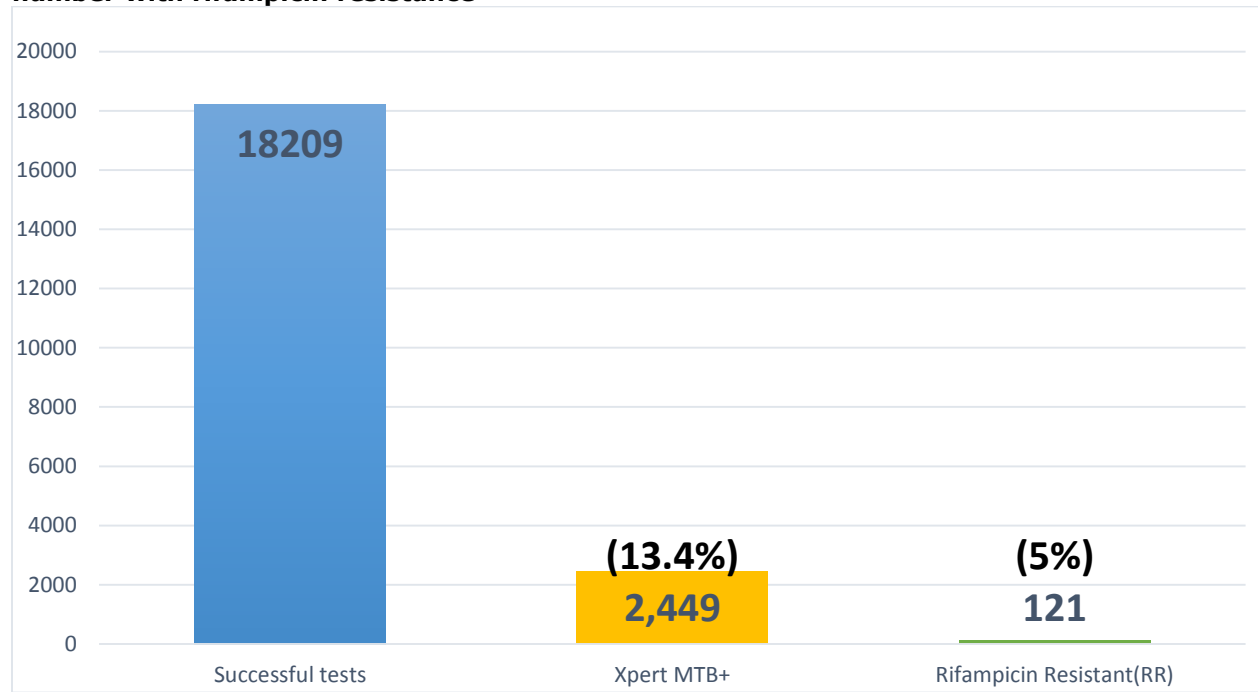
Seven laboratory staff members and seven technical staff members were hired by the project to provide support to the health facilities in the implementation of the Three I's. The staff members provided support in the quantification of laboratory commodities, testing of samples, active case finding with community volunteers and support for tracking of presumptive MDR-TB cases. The project also procured seven motor bikes for the transportation of sputum samples to the Xpert diagnostic sites.

A team of supervisors conducted supervisory visits and mentorship in Xpert MTB/RIF technology to all the implementing facilities during the last year of project support. The team included staff members from the NTP, the NTRL, the MoH and TB CARE I. Two standard checklists were developed for clinicians and for laboratory staff members to observe facility level use of the Xpert MTB/RIF technology. The visits also provided an opportunity to train the facility staff on quantification of cartridges required in the facility on a monthly basis, Xpert maintenance procedures, troubleshooting and reduction on errors obtained from test results. Facility staff have become competent to use and maintain the Xpert MTB/RIF machines and accessories even after project close-out and reporting to the NTRL.

Challenges with module failure of the Xpert machines occurred that caused some delay in the active use of the equipment. The project and MoH staff members were able to repair the machines, working with Cepheid staff members. A company has been engaged in Zambia by Cepheid to provide support for the maintenance of the Xpert machines and this will provide the technical support needed for calibration and module failure.

There was also delay or non-referral of rifampicin resistant samples from the diagnostic facilities to the NTRL resulting in patients becoming lost to follow-up or dying before initiation of second line anti-TB treatment. The project staff provided support in tracing the presumptive MDR-TB cases at facility and community level to help them with referral to care.

Figure 1: Total number of Xpert tests performed with number of Xpert positive results and number with rifampicin resistance



Xpert MTB/RIF machine and accessories following installation in August 2013, at Chavuma clinic in Kitwe, Copperbelt province

Establishment of a sputum sample referral system for presumptive MDR-TB cases

The NTRL in partnership with TB CARE I provided transport support for the referral of sputum samples for drug resistant TB testing from 27 facilities in five provinces. The sample transportation was done by a private courier company called the Zambia Postal Services (Zampost) from November 2013 to December 2014. This service cost the project \$500 per month for all the facilities and can be replicated throughout the country. Facility laboratory staff members and the Zampost staff members received training in the packaging of the samples for safe transportation by Zampost. The table below shows that 5% (22/407) of the patients that had samples sent for culture and DST were found with MDR-TB. The NTP has planned to scale up the sample courier countrywide using Zampost that can provide the service countrywide and will receive funding support from the Global Fund under the NFM.

Table 1: Number of patients that sent samples for culture and DST and number of patients found with MDR-TB from the five provinces that participated in the courier system

Province	No. of patients with sputum samples sent for culture and DST	Number diagnosed with MDR -TB
Copperbelt	240	9
Central	54	9
Northern	20	3
Muchinga	3	0
Eastern	90	1
Total	407	22

Infection Control

TB infection control became an integral part of the TB CARE I support to the NTP. Infection control measures were successfully implemented during the life of the project in eight provinces, in a total of 81 facilities.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
3.2.2	Facilities implementing TB IC measures with TB CARE support	Facilities that received support for the implementation of TB IC measures through TB CARE out of the number of facilities planned to receive support for TB IC implementation	Year 3: 35% (15/43)	100% (43/43)	102% (44/43)

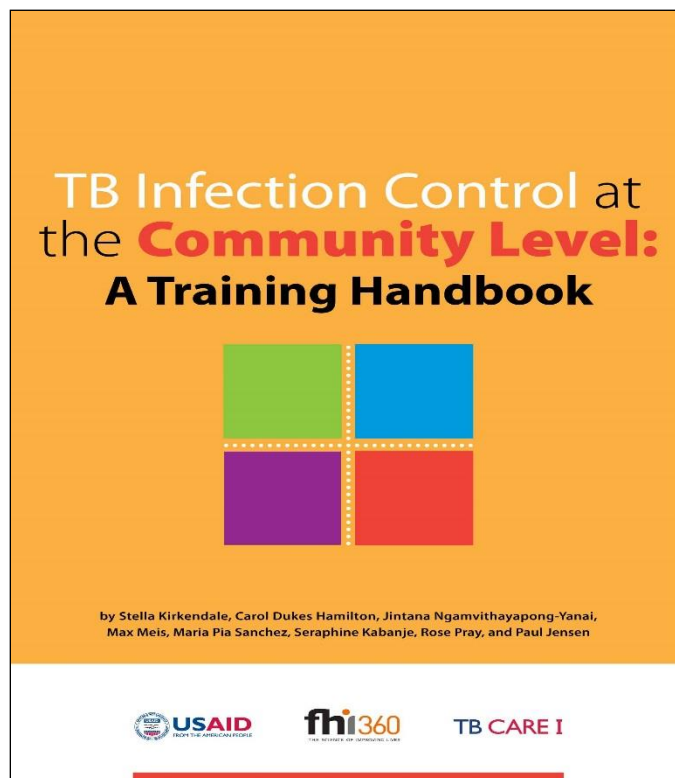
Key Results

Implementation of Infection control in health facilities, prison settings and communities

TB IC activities were successfully implemented in 81 facilities and eight prisons during the life of the project. A total of 2,118 people received training in TB IC during the life of the project (1,146 females, 972 males). The support to the prisons enabled the project to provide IC measures in a congregate setting with limited application of environmental controls. The prison authorities and facilities were very cooperative and enhanced administrative measures including isolation of coughing TB patients were possible. The prison leadership participated in the training facilitation as well.

Renovation support was also provided to 24 facilities that included renovations at the NTRL and one regional reference laboratory where the MTBDRplus GenoType (Hain) equipment was placed. Five health care workers also received international training in IC and they have become national level consultants who provided key technical support in the monitoring of IC activities, working with provincial and district level TB coordinators.

In the Central and Copperbelt provinces, community volunteers received training in IC and were able to provide community and household level IC support. The NTP developed TB IC guidelines in 2009, following participation in global consultative meetings and trainings. The country also developed a community TB IC package that consisted of three TB IC checklists together called: "The Simplified Checklist for TB Infection Control" and a training handbook for community volunteers called: "TB Infection Control at the Community level: A training Handbook".



Monitoring TB IC compliance with the four areas of IC measures- managerial, administrative, environmental and respiratory protection

TB CARE I partnered with the MoH, MCDMCH and CIDRZ staff members to provide technical monitoring visits to 39 health facilities under the Three I's supported sites in four provinces. Teams comprising three staff members provided mentorship in the implementation of facility and community

level IC measures. Monitoring visits were conducted using a standard checklist, following the initial baseline assessment and support to develop a TB IC plan. The visits enabled the facilities to conduct a self-assessment of their compliance in implementing the key elements of infection control.

A global TB IC tool with 32 questions is available to use for the monitoring of compliance to IC activities at health facility level. Fifteen of the facilities in the Central and Copperbelt provinces were assessed for compliance and a compliance score of 80% and above was the target. 86.6% of the facilities (13/15) were compliant with more than an 80% score at endline compared to only one facility (6.7%) being compliant at baseline.

The challenges with meeting the target for IC compliance included staff movement/relocation to other facilities, lack of adequate supervision and monitoring of activities by the facilities and district staff members, lack of screening of health care workers for TB in almost all facilities, inadequate space for provision of health services.

The Ndola District Tuberculosis Infection Control demonstration project- Core project

TB CARE I participated in a focused implementation of this important project in Ndola District, Copperbelt province from October 2011 to June 2014. The goal of the project was to provide safe work practices in order to reduce TB transmission among people living with HIV (PLHIV) and HCWs. The support was aimed at strengthening the district healthcare system in implementing TB IC. The project provided for introduction and reinforcing of IC measures through twelve interventions implemented by September 2013. The District Community Medical Officer (DCMO) provided leadership and there was full involvement of facility heads and TB treatment supporters. TB IC plans were incorporated in annual facility plans and district budgets, and facilities adhered to key TB IC work practices. The twelve interventions are listed below:

1. Start-up meeting
2. Baseline facility assessment
3. Training of key facility and supervisory staff
4. Facility specific TB IC plans, policies and procedures
5. Work practices compliance
6. FAST (core package) strategy
7. Quarterly supervisory visits
8. TB and HIV screening among HCWs
9. IEC materials
10. Minor renovations
11. Abstracts and publications
12. End-symposium

A number of successes were achieved with the project that included the screening in one year of 1,619 health care workers (HCWs) and 138 TB treatment supporters. Eighteen HCWs were diagnosed with TB and the notified TB incidence among HCWs was 1.02%. The case notification rate (CNR) ratio among HCWs when compared with the general adult population of Ndola District was 1.05%, suggesting good implementation of TB IC measures according to the WHO recommended proxy indicator. Twelve out of the 14 facilities that participated in the project had a TB IC compliance above 80%, following 20 months of monitoring of facility level activities. Renovation support was provided to 12 health facilities to enhance environmental controls. The turnaround time to TB diagnosis was also reduced from an average of four days to 1.5 days with active involvement of TB treatment supporters. The good practices from this project were integrated into the implementation of the Three I's project activities.

TB/HIV

Most of the TB/HIV activities were implemented as components of the Three I's initiative that have been described above under Universal Access, Laboratories and Infection Control. The project provided support for national level TB/HIV data review meetings and facility level monthly TB/HIV meetings. In 2014, the national level data indicated that 93% of all TB cases were tested for HIV, 61% were found with HIV, 91% were initiated on Cotrimoxazole Preventive Therapy (CPT) and 73% received ART.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
5.1.1	New HIV patients treated for latent TB infection during reporting period	Numerator: Total number of newly-diagnosed HIV-positive clients in whom active TB has been excluded who start (given at least one dose) treatment of latent TB infection during reporting period. Denominator: Total number of newly-diagnosed HIV-positive clients during reporting period.	Not available (2013)	30% of eligible HIV positive individuals (2013)	N/a: The implementation of IPT was not done during year four because the guidelines were not available. From February to March 2015, nine facilities out of the 15 began providing IPT and 309 individuals received IPT. A percentage cannot be calculated accurately because the facilities were just beginning to provide IPT.
5.2.1	HIV positive patients who were screened for TB in HIV care or treatment settings	Numerator: Number of HIV-positive patients seen at HIV testing and counseling or HIV treatment and care services who were screened for TB symptoms at least once during year. Denominator: Total number of HIV-positive patients seen at HIV testing and counseling or HIV treatment and care services, over the same given time period.	Not available (2013)	100%	90% National level data
5.3.1	HIV positive TB patients started or continued on antiretroviral therapy (ART)	Numerator: All HIV-positive TB patients, registered over a given time period, who receive ART (are started on ART) Denominator: All HIV-positive TB patients registered over the same given time period.	60% (2012)	70%	73% (19,347/29,765) National level data 70% (7,054/10,138) TB CARE I geographic region

Key Results

Facility monthly TB/HIV meetings

Thirteen of the fifteen health facilities in the Three I's supported sites held monthly TB/HIV meetings where the integration of TB/HIV activities were reviewed and agreements made to improve services to both TB and HIV patients. The meetings provided for agreements on ICF activities at facility and community level, with active screening for TB in the out-patient, ART and maternal and child health (MCH) departments. There were agreements on early referral of co-infected patients from the TB clinic to access HIV care and treatment services.

Participation in TB/HIV collaborative activities during World TB Day commemoration

During this year's World TB Day commemoration, the Three I's supported facilities extended sensitization activities on TB/HIV infections to communities, market places, schools and churches working with the community TB treatment supporters. The treatment supporters were also key in the tracing of contacts of individuals diagnosed with TB Xpert technology.

Health System Strengthening (HSS)

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
6.2.1	TB CARE I supported supervisory visits conducted	The indicator measures TB CARE's support of NTP supervisory activities comparing the number of planned visits in the TB CARE I work plan (denominator) to what is actually conducted (numerator)		Y3: 100% Y4: 100% Y5: 100%	Y3: 33% Y4: 17% Y5: 100% There were challenges with conducting supportive supervisory visits in the six target provinces because of conflicting provincial priorities. The PMOs conducted supervisory visits called Performance Assessment Visits that include assessment of all disease areas in the health facilities. In year five, the result was 100% in the target areas for the 3 Is. NTP and TB CARE I staff members conducted supervisory visits in all the Three I's implementing facilities.

Key Results

The project provided support in strengthening the NTP health systems at national, provincial, district, facility and community level through activities described above in the technical areas. Activities included provision of new diagnostics, enhancement of health care worker skills, infrastructure support through renovation and procurement of key equipment, and provision of a referral network for diagnostic services of presumptive MDR-TB.

The project supported a number of local and international technical visits during the implementation of the TB CARE I project activities. Visits were conducted to review and enhance the quality of services being provided in the target provinces. The supervisory support included the development of a number of standard quality - assessment checklists and standard operating procedures (SOPs) for universal access, laboratory support, PMDT, IC and TB/HIV.

There were challenges in the implementation of supportive supervisory visits in the six target provinces during year four of project implementation because of conflicting priorities in the provinces following the integrated approach for all diseases. Monitoring visits were made by PMOs called performance assessment visits that include an assessment of all diseases in the health facilities in the province. The project had challenges to support separate TB supervisory visits with limited human resource at the PMO in TB control, to target a specific disease component for technical support. The project staff provided more support with the national level NTP staff members to the provinces implementing 3 I's activities in the final year of project implementation.

Monitoring & Evaluation, Surveillance and OR

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
7.2.1	Data quality measured by NTP	Data quality measured in the last year at national, intermediate/regional or peripheral levels	2014	Yes	Yes

Key Results

Support for national data review meetings

The project provided annual funding and technical support for national data review meetings where representatives from the ten provinces and some districts shared the TB notifications, patient outcome data and TB/HIV results from the previous year of program implementation. This TB data was analysed by the meeting participants and agreements were made on program improvement, where needed. The local partners including TB CARE I, also made presentations on the support they were providing to the NTP.

Project close out meetings

A national level close out meeting was held on May 14, 2015. The project made a presentation of their key achievements to 105 participants. Representatives from the USAID mission, MoH, MDCMCH, local partners and TB CARE I staff members participated in the meetings. The project also held meetings in February 2015 in each of the districts that received support with participants from PMOs, DCMOs, health facilities and prison facilities. Discussions and agreements were made on the continuity of activities after project close out.



TB CARE I staff members at the project close-out meeting held on May 14, 2015, Intercontinental hotel, Lusaka (photo taken by hotel staff member)

TB CARE I's support to Global Fund implementation

Zambia received \$158 million from the Global Fund in January 2015, after successful application to the Global Fund, New Funding Model (NFM) for a combined HIV/TB concept note. The country developed a National TB Strategic plan (NSP) for 2014 to 2016 with partner support to align with the concept note requirements. TB CARE I partners participated in the revision of the NSP and in the grant application, providing technical input in the development of the GF concept note. External consultants received funding support through the TB CARE I partners for the epidemiological analysis, the development of the concept note narrative and accompanying budgets. The NFM funds will support continuation of some of the activities that the TB CARE I project was providing support towards, including the Three I's activities and laboratory procurement of commodities, quality assurance and staff training in DOTS. The country had also received funding of \$15,174,213 under the round seven grant that was being implemented from 2011 to June, 2015.

The Way Forward

Reflecting on TB CARE I and the 3Is implementation and results, there are many lessons to learn from the project and new approaches to prioritize going forward.

Universal Access

Lessons learned:

1. Identification and referral of persons with presumed TB in the community can be successful when community volunteers involved are motivated with training and enablers for the work they are supporting, such as bicycles and cooler boxes, and monetary support.
2. The presence of additional health care workers hired by the project helped the facility staff to appreciate the importance of ICF, including triaging of symptomatic clients in out-patient departments.
3. Use of GeneXpert MT/RIF testing in children increases the proportion of children with bacteriologic confirmed TB.

Challenges: There is limited trained human resource to support ICF activities through TB screening especially among HCWs and in PLHIV. The project observed that the documentation on TB in the ART clinics was not well done possibly because of limited knowledge on the importance of TB/HIV co-infection and the complications related to the co-morbidities.

Recommendations: ICF is a key component of TB control and should be emphasized at health facility and community level of care, especially in PLHIV, children, and health care workers. Health care workers should be continuously sensitized on the importance of TB and HIV co-infection and the effect of both diseases if not diagnosed early.

Laboratories

Lessons learned:

1. Engaging the leadership in the laboratory network at the NTRL enabled the project to strengthen laboratory services and systems with full participation of the MoH and the MCDMCH.
2. The project staff were well trained to provide technical support locally and internationally and other key consultants were available to support the country, including the SRL staff members from the Uganda SRL.
3. Training of both laboratory and clinical staff members enabled a clear understanding on the use and maintenance of the Xpert machine.
4. Assessment of facilities and provision of required accessories including air conditioners before the implementation of Xpert MTB/RIF provided for better use of the new technology under required conditions.

Challenges: The project support for procurement of sputum containers and cartridges was limited to the period of implementation and the NTP will need to continue procuring these commodities.

The NTP requires support to conduct assessment visits for the scale up of Xpert MTB/RIF to other facilities and provinces and will need support to provide on-going supervisory support in the facilities that implemented the Three I's activities.

Unanticipated module failure of Xpert machines occurred during project implementation that caused some delay in the active use of the equipment.

Delay or non-referral of rifampicin resistant samples from the diagnostic facilities to the NTRL resulting in patients being lost to follow-up or dying before initiation of second line anti-TB treatment.

Recommendations: The introduction of Xpert MTB/RIF for programmatic use was well done through agreements at national level before activities were implemented. The establishment of a national subcommittee provided the country with guidance on implementation processes and this approach has

been successful with agreements on a training curriculum on the proper use of Xpert machines, maintenance and calibration.

Infection Control

Lessons learned:

1. Involvement of facility managers in the implementation of the facility level TB IC activities enhanced the continuity of activities.
2. Infection control measures can be introduced to prison facilities even with limited space for isolation of symptomatic patients.
3. Building capacity of government health care workers as consultants in IC provided adequate staff to support implementation of IC in many facilities.
4. Community involvement in IC enhanced support to the health facilities where volunteers helped to open windows and give health talks on IC.

Challenges: The rotation of staff members in some districts including key facility managers who were active in implementing IC activities in the target facilities prevented continuity of some activities. The low numbers of HCWs screened for TB was also due to a lack of specific government policy to actively screen HCWs for TB on an annual basis.

Recommendations:

Infection control should be a key component of TB control activities in future projects and should include facility and community level involvement. IC measures should also be introduced to prison facilities and prisoners should be actively involved in identifying and implementing good practices in IC.

TB/HIV

Lessons learned:

The Three I's project had a focus on key TB/HIV collaborative areas that have been mentioned above under ICF (Universal Access) and Infection Control. The Three I's project provided an opportunity for the integration of TB and HIV services in the care of patients with one or both diseases. The project provided support for facility level monthly meetings where agreements were made on enhancing services provided for TB and HIV patients.

Challenges: TB data from co-infected patients was not readily accessible in the ART clinics and it was not possible to confirm if all co-infected patients received early access to HIV care and treatment. Data was more available on HIV care and treatment in all records. Through the quarterly quality assessment visits to each facility, the project was able to see some improvement in the recording of TB diagnostic and treatment data in the ART clinic records.

HSS

Lessons Learned:

1. Programmatic implementation of the 3I's was successful with active participation of the facilities through capacity building (such as training and mentorship), monitoring and supervision of activities.
2. The strengthening of health systems is successful and sustainable when leadership is provided by NTP, PMO and DCMOs.
3. Funding for infrastructure support for minor renovations was successfully included in the district or provincial budgets.

M&E, OR, and Surveillance

Lessons learned:

The NTP will require continued strengthening in OR and will need dedicated NTP staff to implement OR. There is limited staff capacity to conduct OR and limited investment with the division of services between the MoH and MCDMCH. The research unit currently operates from the MoH, while the NTP staff are under the MCDMCH

Annex I: Knowledge Exchange

Below is a list of tools and publications that were developed with support from TB CARE I-Zambia over the life of the project. Please contact the project staff for copies of or links to any of the listed documents.

Technical Tools:

- National Tuberculosis Infection Control Guidelines for Health Care and Congregate Settings (reprinting)
- Xpert MTB/RIF Implementing Guidelines for Zambia (development and printing)
- Revised Zambia National TB Strategic Plan 2014-2016 (development)
- Guidelines for the Programmatic Management of Drug Resistant Tuberculosis (PMDT) (development)
- National TB Advocacy Communication and Social Mobilization Strategic Plan 2014-2016 (development)
- National Protocol and Standard Operating Procedures for the National TB Prevalence Survey (development)
- TB quality assessment tool for Three I's (TB-QUAL)

Abstracts and presentations:

R Chibumbya, N Nyoni, C Mwila, M Muvwimi. **Selection of supervising laboratories for peripheral facilities in the EQA program for the Copperbelt Province of Zambia**, abstract accepted to the 43th Union World Conference on Lung Health in Kuala Lumpur, Malaysia, November 2012

Meis M, Kaminsa Kabanje S, Mukwangole C, Maambo L, Hamilton C, Maboshe M, Longwe J, Kapata N. **Demonstration model for scale up of TB infection control in Ndola, Zambia**. Poster presentation at the Infection Control Africa Network conference, Cape Town, South Africa, November 2012 (Core project funded from 2012-2014)

Kirkendale S, Nota A, Maambo L, Chilo A, Kaminsa Kabanje S, Simpungwe MK, Kapata, N. **TB Infection Control (IC) in Household and Community Settings, Ndola Zambia**. Poster presentation at the Infection Control Africa Network conference, Cape Town, South Africa, November 2012 (Core project funded from 2012-2014)

Meis M, Kaminsa Kabanje S, Mukwangole C, Kakungu Simpungwe M, Hamilton C, Maboshe M, Longwe J, Kapata N. **Demonstration model for scale up of TB infection control in Ndola, Zambia**, S Kirkendale, S Kaminsa, A Nota, C Hamilton, R Pray, L Maambo, MK Simpungwe, N Kapata. **TB Infection Control in the Community Setting**. Oral presentation at the 44th Union World Conference on Lung Health in Paris, France, November 2013 (Core project funded from 2012-2014)

Suzanne Verver, Nathan Kapata, Mathildah Kakungu Simpungwe, Seraphine Kaminsa, Mavis Mwale, Chitambeya Mukwangole, Bernard Sichinga, Max Meis. **Implementing HCW TB screening in primary care clinics and hospitals in Ndola, Zambia**. Oral presentation at the 44th Union World Conference on Lung Health in Paris, France, November 2013 (Core project funded from 2012-2014)

Henry Phiri, J. Anitha Menon, Rose Masilani, Sandra Sakala, Bernard Sichinga, Seraphine Kabanje, Anke Kwaak Anke van der. **Perceived quality of health service among Tuberculosis patients in Zambia**, Poster presentation at the 44th Union World Conference on Lung Health in Paris, France, November 2013 (Core project funded from 2012-2013)

J. Anitha Menon, Seraphine Kabanje, Henry Phiri, Rose Masilani, Liezel Wolmarans, Ernest Kakoma, & Bernard Sichinga. **An exploratory study on Stigma associated with Tuberculosis in a Zambian Adult population**, Poster presentation at the 44th Union World Conference on Lung Health in Paris, France, November 2013 (Core project funded from 2012-2013)

G. Kahenya, N. Kapata, M. Muvwimi, S. Kaminsa, C. Mulenga, R. Chibumbya. **Strengthening TB Specimen referral in Zambia to improve diagnostic capacity: A stepwise approach**, Poster presentation at the 45th Union World Conference on Lung Health in Barcelona, Spain, October 2014.

Educational materials:

- Training curriculum for the Programmatic Management of Drug resistant TB (development)
- TB Infection Control training package for prison facilities
- Training curriculum for Xpert MTB/RIF